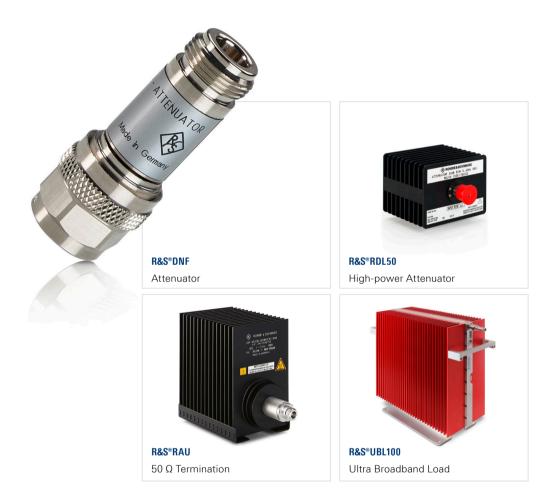
ATTENUATORS, MATCHING PADS, TERMINATIONS AND ULTRA BROADBAND LOAD

75 mW to 1000 W, DC to 18 GHz



Product Flyer Version 10.00

ROHDE&SCHWARZ

Make ideas real



ATTENUATORS R&S®DNF

As a rule, the reflection coefficient of commercial signal generators or test receivers is about 20%. This value may be too high for precise measurements. To improve matching, an attenuator should be inserted after the signal generator output and another one ahead of the receiver input. This will reduce the reflection coefficients of both the generator and the receiver.

Signal generators often do not have a defined source impedance. In these cases, it is advisable to insert a 16 dB (10 dB + 6 dB) attenuator. The internal reflection coefficient of such a signal source is thus reduced to about 3%, which is small enough for accurate measurements.

Attenuators can also be used as reference standards for attenuation and gain measurements in line with the substitution method, for precise voltage division and as buffers to isolate test circuits.

R&S®DNF (1 W/2 W)

Small attenuation error, largely frequency-independent attenuation and low VSWR are special features of the R&S®DNF attenuators. They are sturdy, immune to vibration (in line with MIL-A-3933), only slightly temperature-dependent and resistant to short-term overloading. The R&S®DNF attenuators are equipped with N connectors (male, female) and are available with 3/6/10/20 dB attenuation.





HIGH-POWER ATTENUATORS R&S®RBU, R&S®RDL

High-power attenuators are used as dummy loads for transmitters and amplifiers in the frequency range 0 Hz to 6 GHz. Their constant attenuation enables harmonics measurements on transmitters, TV transposers and other equipment.

The high-power attenuator is superior to a simple termination. The power applied can be accurately determined from the power measured at the test output and from the known attenuation. Moreover, a frequency counter or analyzer can be connected to the test output.

R&S®RDL50 (50 W)

The R&S[®]RDL50 high-power attenuator is suitable for the frequency range up to 6 GHz. A special feature is its constant low attenuation over the entire frequency range.

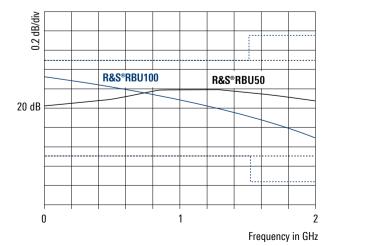
R&S®RBU (50 W/100 W)

The R&S[®]RBU high-power attenuators with 3/6/10/20/30 dB attenuation are ideal for applications in the frequency range up to 2 GHz, which is of particular interest for mobile radio measurements. The attenuators are characterized by low VSWR and low attenuation error throughout the entire frequency range.

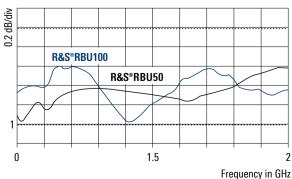
Due to the large heat sink, the attenuator surface temperature does not rise above +75 °C (at +25 °C ambient temperature) even under full load.



R&S®RDL50, 50 W



Typical characteristics of the R&S®RBU50 and R&S®RBU100 attenuators (20 dB attenuation)



TERMINATIONS R&S®RNB, R&S®RAD, R&S®RAU



R&S®RNB



R&S®RAD

R&S®RNB (1 W)

The R&S[®]RNB 50 Ω termination is a versatile line termination used in type N coaxial line systems. A special feature is the very low reflection over a wide frequency range. The use of high-grade metal-film resistors provides a continuous power-handling capacity of 1 W.

The R&S[®]RNB termination is for general use in the frequency range from DC to 4 GHz.

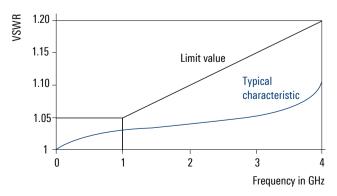
$R\&S^{\$}RAD$ (500 mW) and $R\&S^{\$}RAD50$ (2 W) feedthrough terminations

The R&S[®]RAD feedthrough terminations are used for matching 50 Ω lines to test and measurement instruments with high input impedance (e.g. oscilloscopes or tuners with 1 M Ω input impedance). The feedthrough termination must be plugged directly onto the input connector of the instrument to ensure optimum matching.

R&S®RAU (100 W)

The R&S[®]RAU termination is mainly used as a dummy antenna for mobile and stationary transmitters. Its low VSWR makes it also suitable for TV equipment.

Limit value and typical VSWR characteristic of the R&S®RNB





MATCHING PADS R&S®RAM, R&S®RAZ

For the precise measurement of insertion loss and phase shift, the signal generator, DUT and receiver must be well matched to one another. Matching pads allow systems of different characteristic impedance to be connected without costly retrofits.

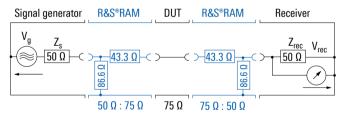
R&S®RAM and R&S®RAZ (2 W) matching pads

The bidirectional R&S®RAM matching pad provides the match between 50 Ω and 75 Ω impedance systems in both directions up to 2.7 GHz, causing minimum attenuation. Care should be taken that ports with the same characteristic impedances are connected to one another.



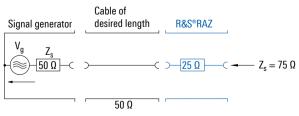
R&S®RAZ

R&S®RAM



Two R&S[®]RAM matching pads to match a 75 Ω DUT to a signal generator and receiver, each having a characteristic impedance of 50 Ω .

R&S®RAZ



By connecting an R&S®RAZ matching pad consisting of a 25 Ω series resistor, a signal generator with a 50 Ω output has an output impedance of 75 Ω .

Voltage transformation is defined as the ratio in dB of the voltages at the connectors:

$$\mathcal{A}_{50\ \Omega \rightarrow 75\ \Omega} = 20 \cdot \text{lg} \ \frac{\text{U}_{50\ \Omega}}{\text{U}_{75\ \Omega}} = 4\ \text{dB}$$

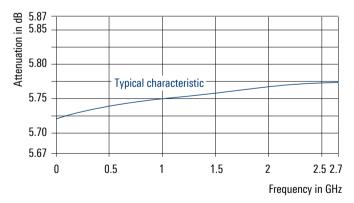
$$\mathcal{A}_{75\ \Omega \ \rightarrow \ 50\ \Omega} = 20 \cdot \text{Ig} \ \ \frac{\text{U}_{75\ \Omega}}{\text{U}_{50\ \Omega}} = 7.5 \text{ dB}$$

Power attenuation is the same in both directions:

$$A_p = 10 \cdot \lg \frac{U_{75 \Omega}^2 \cdot 50 \Omega}{75 \Omega \cdot U_{50 \Omega}^2} = 5.72 \text{ dB}$$

The unidirectional R&S®RAZ matching pad is particularly suitable for the matching of signal generators. In most cases, signal and sweep generators have a source impedance of 50 Ω . They can be adapted to feed 75 Ω systems by means of the R&S®RAZ matching pad involving extremely low power loss. The output voltage displayed on the generator is also valid for the 75 Ω system and does not require correction.

Frequency response and error limits of power attenuation of the R&S®RAM matching pad



OVERVIEW ATTENUATORS, FEEDTHROUGH TERMINATIONS, TERMINAT

Specifications including ordering information

| | | Type Order No. | Characteristic impedance | Power rating | Nominal attenuation | Frequency range | VSWR |
|---------------|------------------------|-------------------|-----------------------------------|----------------------------------------------|---------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| | | R&S®DNF | | | | | |
| Attountare | | 0272.4010.50 | | 2 W ¹⁾ | 3 dB | | |
| | | 0272.4110.50 | | 2 VV '' | 6 dB | | |
| | ators | 0272.4210.50 50 Ω | 1 14/1) | 10 dB | 0 Hz to 12.4 GHz | ≤ 1.1 (0 Hz to 4 GHz) ≤ 1.2 (4 GHz to 10 GHz) ≤ 1.25 (10 GHz to 12.4 GHz) | |
| | Attenu | 0272.4310.50 | 72.4310.50 | 1 W ¹⁾ | 20 dB | | |
| | | R&S®RBU 50 | | | | | |
| | | 1073.8695.03 | 1073.8695.06 1073.8695.10 50 Ω | | 3 dB | | |
| | | 1073.8695.06 | | | 6 dB | | ≤ 1.15 |
| | | 1073.8695.10 | | 50 W ³⁾ | 10 dB | 0 Hz to 2 GHz | |
| | | 1073.8695.20 | | | 20 dB | | |
| | | 1073.8695.30 | | | 30 dB | | |
| | | R&S®RBU 100 | | | | | |
| | | 1073.8495.03 | | | 3 dB | | ≤ 1.15 |
| | | 1073.8495.06 | | | 6 dB | | |
| | itors | 1073.8495.10 | 50 Ω | 100 W 5) | 10 dB | 0 Hz to 2 GHz | |
| | enna | 1073.8495.20 | | | 20 dB | | |
| | r att | 1073.8495.30 | | | 30 dB | | |
| | owe | R&S®RDL 50 | | | | | |
| | High-power attenuators | 1035.1700.52 | 50 Ω | 50 W (input), 10 W (output) ¹⁾ | 20 dB | 0 Hz to 6 GHz | ≤ 1.15 (0 Hz to 2 GHz) ≤ 1.25 (2 GHz to 4 GHz) ≤ 1.4 (4 GHz to 6 GHz) |
| | | R&S®RNB | | | | | |
| | | 0272.4910.50 | 50 Ω | 1 W ¹⁾ , 2 W (peak) | | 0 Hz to 4 GHz | ≤ 1.05 (0 Hz to 1 GHz) ≤ 1.1 (1 GHz to 2 GHz) ≤ 1.2 (2 GHz to 4 GHz) |
| | ions | R&S®RAU | | | | | (|
| | Terminations | 0200.0019.55 | 50 Ω | 100 W ⁶⁾ | | 0 Hz to 2 GHz | ≤ 1.05 (0 Hz to 0.3 GHz) ≤ 1.1 (0.3 GHz to 1.5 GHz) ≤ 1.4 (1.5 GHz to 2 GHz) |
| | | R&S®RAD | | | | | |
| Feedthrough | . SI | 0289.8966.00 | 50 Ω | 500 mW ⁷⁾ | | 0 Hz to 1 GHz | ≤ 1.05 (0 Hz to 0.1 GHz) ⁸⁾ ≤ 1.1 (0.1 GHz to 0.5 GHz) ≤ 1.2 (0.5 GHz to 1 GHz) |
| | natio | R&S®RAD 50 | | | | | |
| | terminations | 0844.9352.02 | $50 \ \Omega \pm 0.1 \%$ | 2 W ⁷⁾ | | 0 Hz to 500 MHz | \leq 1.1 (0 Hz to 200 MHz) ⁸⁾ \leq 1.25 (200 MHz to 500 MHz) ⁸⁾ |
| Matching pads | | R&S®RAM | | | | | |
| | | 0358.5414.02 | 50 Ω to 75 Ω | 2 W ⁹⁾ | 5.72 dB | 0 Hz to 2.7 GHz | \leq 1.06 (0 Hz to 2 GHz) \leq 1.2 (2 GHz to 2.7 GHz), both terminals |
| | | R&S®RAZ | | | | | |
| | g pads | 0358.5714.02 | 50 Ω to 75 Ω | 2 14/9 | 1.76 dB | 0 Hz to 2.7 GHz | ≤ 1.06 (0 Hz to 2 GHz) ≤ 1.2 (2 GHz to 2.7 GHz), at 75 Ω end |
| | Matchin | 0358.5714.03 | 50 52 10 7 5 52 | 2 W ⁹⁾ | 1.70 00 | 0 Hz to 3.3 GHz | ≤ 1.06 (0 Hz to 2 GHz) ≤ 1.2 (2 GHz to 3.3 GHz), at 75 Ω end |
| | | | | | | | |

¹⁾ At a max. ambient temperature of +30°C; decreasing linearly to 0 W at +130°C (R&S®RDL50: +125°C).

²⁾ Attenuation change at a temperature change of 1 °K: \leq 0.0001 dB/dB. At a load change of 1 W: \leq 0.001 dB/dB.

³⁾ Input overload capacity up to 150 W at +20°C ambient temperature (max. 10 min); output overload capacity up to 20 W.

⁴⁾ Attenuation change at a temperature change of 1 °K: \leq 0.0004 dB/dB. At a load change of 1 W: \leq 0.0001 dB/dB.

⁵⁾ Input overload capacity up to 250 W at +20 °C ambient temperature (max. 10 min); output overload capacity up to 20 W.

6) Overload capacity 100% (max. 5 s).

⁷⁾ Continuous power rating up to a maximum ambient temperature of +70°C; decreasing linearly to 0 W at +130°C.

8) Measured with open-circuit output.

⁹⁾ Ambient temperature +25°C.

FIONS, MATCHING PADS

| Attenuation (N = nominal value) | Max. peak pulse voltage | Connectors | Dimensions, weight |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------|----------------------------------|
| N ± 0.3 dB (0 Hz to 8 GHz) ²⁾ | | | |
| $\begin{split} &N \pm 0.5 \text{ dB } (8 \text{ GHz to } 12.4 \text{ GHz})^{2i} \\ &N \pm 0.3 \text{ dB } (0 \text{ Hz to } 8 \text{ GHz})^{2i} \\ &N \pm 0.6 \text{ dB } (8 \text{ GHz to } 12.4 \text{ GHz})^{2i} \\ &N \pm 0.5 \text{ dB } (0 \text{ Hz to } 4 \text{ GHz})^{2i} \\ &N \pm 0.6 \text{ dB } (4 \text{ GHz to } 8 \text{ GHz})^{2i} \end{split}$ | | N male, N female | 20.5 mm Ø × 55 mm, 69 g |
| N \pm 0.8 dB (8 GHz to 12.4 GHz) ²⁾ | | | |
| N ± 0.6 dB (0 Hz to 1.5 GHz) ⁴⁾ N ± 0.85 dB (1.5 GHz to 2 GHz) ⁴⁾ N ± 1.1 dB ⁴⁾ | 5 kW/5 µs | N male, N female | 180 mm × 77 mm × 90 mm, 0.8 kg |
| | | | |
| N ± 0.6 dB (0 Hz to 1.5 GHz) 4) N ± 0.85 dB (1.5 GHz to 2 GHz) ⁴) N ± 1.1 dB ⁴) | 5 kW/5 µs | N male, N female | 236 mm × 140 mm × 141 mm, 2.8 kg |
| | | | |
| N ± 0.5 dB | 2 kW/5 µs | N male, N female | 114 mm × 89 mm × 68 mm, 0.5 kg |
| | | | |
| | | N male | 20.5 mm Ø × 35 mm, 36 g |
| | | | |
| | 2 kV | N female | 95 mm × 152 mm × 235 mm, 2 kg |
| | | BNC male, BNC female | 14.5 mm Ø × 50.5 mm, 22 g |
| | | DNC male | |
| | | BNC male, BNC female | 15.3 mm Ø × 50.5 mm, 22 g |
| 5.72 dB + 0.15/- 0.05 dB | | N male, N female at 75 Ω end | 21 mm Ø × 73 mm, 105 g |
| | | | |
| 1.76 dB ± 0.2 dB | | N male, N female at 75 Ω end | 21 mm Ø x 73 mm, 105 g |

ULTRA BROADBAND LOAD R&S®UBL100

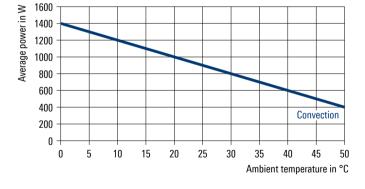
The R&S®UBL100 is an ultra broadband load that can be used from DC to 18 GHz.

The dummy load absorbs RF power and dissipates it through convection cooling. An optional fan unit improves heat dissipation. A built-in interlock loop can be used to switch off the device feeding the load when the heatsink temperature rises above +70 °C. Unlike cable loads, there is no lower frequency limit. The R&S°UBL100 can absorb up to 1800 W.



Maximum permissible average power as a function of ambient temperature

Maximum average power with convection cooling for +70 °C heatsink temperature



Key facts

- ▶ Very good return loss, especially up to 6 GHz
- High power capability
- Very rugged for short-term overload
- ► High crest factor capability
- ► Easy handling with optional caster wheels

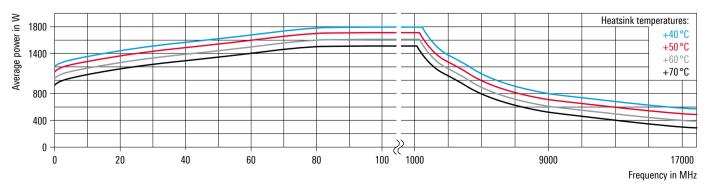
Power handling capability

The first diagram shows the derating of the load for convection cooling due to the limited ability of the heatsink to dissipate the absorbed energy for a given ambient temperature and maximum heatsink temperature of +70 °C. The heatsink temperature reaches a stable value after more than one hour of continuous operation of the load.

The second diagram describes the maximum permissible input power in Watt due to the limits of the internal circuitry of the load. The derating is a function of the heatsink temperature. Between 80 MHz and 1000 MHz, the value for the maximum input power is constant. To prevent damage, the specified maximum average input power for a heatsink temperature of +70 °C must not be exceeded.

When the optional fan unit is used, only the second diagram is relevant. In the case of convection cooling, both diagrams need to be taken into account, and the diagram giving the lower limit defines the maximum permissible input CW power for a certain frequency and ambient temperature.

Maximum permissible average power as a function of frequency and heatsink temperature



| Frequery range DC to 18 GHz Input impudance 50 Q Input impudance 50 Q Input onnector 4.310 fermale, adspter to N included Input VSWR (including N adspter) 5 2 GHz s 1.15 6 GHz < 1 5 0 GHz s 1.15 Average input power P _{ag} ¹⁰ f s 80 MHz denting, ase dagrams on page 8 Average input power P _{ag} ¹⁰ f s 80 MHz denting, ase dagrams on page 8 Creat factor for OFDM bit Media 1 MHz s 12 dB Peek power (Muy cycle < 1%) f s 650 MHz < 100 up pulse width s 15 KW Maximum heatsink temperature subco, near the interlock connector s 100 GHz Typical heatsink temperature subco, near the interlock connector s 100 GHz Thermeswitch rating diago ground, pin to pin s 50 V Temperature protection current s 10 GHz Thermeswitch rating vilago to ground, pin to pin s 10 GHz Cooling current s 10 GHz s 10 GHZ Ground Low current s 10 GHZ s 10 GHZ Colong current s 10 GHZ </th <th>Specifications R&S®UBL100</th> <th></th> <th></th> | Specifications R&S®UBL100 | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------|
| input connactor43-10 female, adapter to N includedInput VSWR (including N adapter)f < 2 GHz | Frequency range | | DC to 18 GHz |
| Input VSWR (including N adapter)f s 2 GHzs 1.152 GHz s f s 0 GHzc 1.252 GHz s f s 0 GHzc 1.25Average input power P _{ang} "f s 60 MHz4 Set 0 MHzderating, see diagrams on page 80 GHZ s f s 1.0 GHzderating, see diagrams on page 86 T 1.0 GHzderating, see diagrams on page 86 T 1.0 GHzderating, see diagrams on page 87 Set 10 GFZf s 1.0 GHz7 Set 10 GFZf s 650 MHz, s 100 µs pulse width8 Set 10 µs pulse widths 15 KW9 Pak power (dury cycle - 1%)f s 650 MHz, s 1 ms pulse width9 F 10 GHZsuface, near the interlock connector7 yricial heatsink temperaturesuface, near the interlock connector7 yricial heatsink temperature T _{an} at +20°C ambient temperature and 1000 Waverage power100 Waverage powersee user manual + 33°C with optional fan unit, see user manual + 33°C with optional fan unit see user manual + 33°C with optional fan unit, see user manual + 33°C with optional fan unit see user manual + 33°C with optional fan unit10 Contenurent <td< td=""><td>Input impedance</td><td></td><td>50 Ω</td></td<> | Input impedance | | 50 Ω |
| 2 GHz <f 6="" ghz<="" th="" ≤="">< 1.25Average input power P_{a_a}2 GHz <f 18="" ghz<="" td="" ≤="">typ. = 1.50, max. 2.25 possible at a few discrete frequencies max. 2.25 possible at a few discrete frequencies mormal disc</f></f> | Input connector | | 4.3-10 female, adapter to N included |
| 6 GHz <1 ≤ 18 GHz | Input VSWR (including N adapter) | f ≤ 2 GHz | ≤ 1.15 |
| Nerge input power P _{ang} " is 80 MHz miss. 225 possible at a few discrete frequencies Average input power P _{ang} " is 80 MHz derating, see diagrams on page 8 Box MHz < f \$ 1.0 GHz | | $2 \text{ GHz} < f \le 6 \text{ GHz}$ | ≤ 1.25 |
| Action of the second | | 6 GHz < f ≤ 18 GHz | |
| Build and see diagrams on page 8 see diagrams on page 8 Crest factor for OFDM bandwidth > 1 MHz \$12 dB Peak power (duty cycle < 1%) | Average input power P _{avg} ¹⁾ | f ≤ 80 MHz | derating, see diagrams on page 8 |
| Crest factor for OFDMbandwidth > 1 MHz< 12 dBPeak power (duty cycle < 1%) | | 80 MHz < f ≤ 1.0 GHz | |
| Peak power (duty cycle < 1%) | | f > 1.0 GHz | derating, see diagrams on page 8 |
| Image: Set of | Crest factor for OFDM | bandwidth > 1 MHz | ≤ 12 dB |
| Maximum heatsink temperature surface, near the interlock connector \$ +70°C Typical heatsink temperature T _{vis} at +20°C ambient temperature and 1000 W average power > +33°C with optional fan unit, see user manual Temperature protection - D-Sub, 9-pin female, pin 1 and pin 5 Interlock loop connector (themoswitch) - D-Sub, 9-pin female, pin 1 and pin 5 Thermoswitch rating voltage to ground, pin to pin \$ 50 V Cooling current \$ 1 A Cooling current \$ 1 A General data - \$ 92 mm x 480 mm x 198 mm (19.4 in x 18.9 in x 7.8 in) Velight - \$ 50 V to 264 V AC, 47 Hz to 63 Hz Fan unit \$ 0.9 A \$ 0.9 A Coverenture ranges \$ 50 V to 264 V AC, 47 Hz to 63 Hz Minimum operating temperature (ambient) int spical lab environment approx. 77.5 dB(A) Rated current \$ 50 V to 264 V AC, 47 Hz to 63 Hz \$ 50 V to 264 V AC, 47 Hz to 63 Hz Maximum operating temperature (ambient) int spical lab environment approx. 77.5 dB(A) Maximum operating temperature (ambient) ultra broadband load \$ 50°C Minimum operating | Peak power (duty cycle < 1%) | f \leq 650 MHz, < 100 μ s pulse width | ≤ 15 kW |
| Typical heatsink temperature T _{ne} at +20°C ambient temperature and 1000 W average power + +20°C for convection cooling, see user manual Temperature protection Intermoswitch for external interlock loop, normally closed, opens at > +70°C Interlock loop connector (thermoswitch) D-Sub, 9-pin female, pin 1 and pin 5 Thermoswitch rating voltage to ground, pin to pin < 50 V | | f > 650 MHz, < 1 ms pulse width | ≤ 15 kW |
| Typical heatsink temperature T _{he} at +20°C ambient temperature and 1000 W average power see user manual Temperature protection fermosonich of external interlock loop, normally closed, opens at >+70°C Interlock loop connector (thermoswitch) DSub, 9-pin female, pin 1 and pin 5 Thermoswitch rating voltage to ground, pin to pin ≤ 50 V Cooling current <1 A | Maximum heatsink temperature | surface, near the interlock connector | ≤ +70°C |
| Iemperature protection normally closed, opens at > +70°C Interlock loop connector (thermoswitch) D-Sub, 9-pin female, pin 1 and pin 5 Thermoswitch rating voltage to ground, pin to pin ≤ 50 V Cooling convection cooling, optional fan unit Cooling convection cooling, optional fan unit General data 492 mm × 480 mm × 198 mm (19.4 in × 18.9 in x 7.8 in) Weight - 492 mm × 480 mm × 198 mm (19.4 in x 18.9 in x 7.8 in) Weight - 492 mm × 480 mm × 198 mm (19.4 in x 18.9 in x 7.8 in) Weight - 492 mm × 480 mm × 198 mm (19.4 in x 18.9 in x 7.8 in) Weight - 492 mm × 480 mm × 198 mm (19.4 in x 18.9 in x 7.8 in) Weight - 492 mm × 480 mm × 198 mm (19.4 in x 18.9 in x 7.8 in) Weight - 492 mm × 480 mm × 198 mm (19.4 in x 18.9 in x 7.8 in) Weight - 55 V to 264 V AC, 47 Hz to 63 HZ Rated current aprox. 77.5 dB(A) 200 A Noise emission in typical lab environment aprox. 77.5 dB(A) Fmerature ranges - - - Maximum operating temperature (ambient) ultra broadband load an | Typical heatsink temperature T_{hs} | • | see user manual +33 °C with optional fan unit, see user manual |
| Thermoswitch rating voltage to ground, pin to pin ≤ 50 V current current ≤ 1 A Cooling convection cooling, optional fan unit General data | Temperature protection | | |
| current< 1 ACoolingconvection cooling, optional fan unitGeneral dataDimensions (W × H × D)including handles and feet492 mm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in)Weight-492 nm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in)Fan unit-492 nm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in)Weight-55 V to 264 V AC, 47 Hz to 63 HzFan unit-85 V to 264 V AC, 47 Hz to 63 HzRated current85 V to 264 V AC, 47 Hz to 63 HzNoise emissionin typical lab environmentapprox. 77.5 dB(A)Environmental conditions-Temperature ranges-Minimum operating temperature (ambient)ultra broadband load and fan unit+5°CMaximum operating temperature (ambient)fan unit460°CMaximum operating temperature (air inlet)fan unit-40°C to +80°CDamp heatultra broadband load and fan unit-40°C to +80°CDemp | Interlock loop connector (thermoswitch) | | D-Sub, 9-pin female, pin 1 and pin 5 |
| Coolingconvection cooling, optional fan unitGeneral dataDimensions (W × H × D)including handles and feet492 mm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in)Weight45 kg (99.2 lb)Fan unitOperating voltage range85 V to 264 V AC, 47 Hz to 63 Hz s 0.9 ARated current60.9 ANoise emissionin typical lab environmentapprox. 77.5 dB(A)Environmental conditionsErwironmental rangesMinimum operating temperature (ambient)ultra broadband load and fan unit+5°CMaximum operating temperature (ambient)ultra broadband loadsee derating curve for average power versus ambient temperature on page 2Maximum operating temperature (air inlet)fan unit+45°CMaximum operating temperature (air inlet)fan unit+60°CStorage temperature rangeultra broadband load and fan unit-40°C to +80°CDamp heatultra broadband load and fan unit=95% noncondensingOperation above sea levelultra broadband load and fan unit2000 m | Thermoswitch rating | voltage to ground, pin to pin | $\leq 50 \text{ V}$ |
| General data 492 mm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in) Dimensions (W × H × D) including handles and feet 492 mm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in) Weight 45 kg (99.2 lb) 45 kg (99.2 lb) Far unit 50 V to 264 V AC, 47 Hz to 63 Hz Rated current 85 V to 264 V AC, 47 Hz to 63 Hz Noise emission in typical lab environment approx. 77.5 dB(A) Environmental conditions sec derating curve for average power versus ambient temperature ranges Minimum operating temperature (ambient) ultra broadband load and fan unit +5°C Maximum operating temperature (ambient) fan unit 445°C Maximum operating temperature (air inlet) fan unit +60°C Maximum operating temperature (air inlet) fan unit -40°C to +80°C Opm heat ultra broadband load sp 5% noncondensing Into into into into into into into into i | | current | ≤ 1 A |
| Dimensions (W × H × D)including handles and feet492 mm × 480 mm × 198 mm (19.4 in × 18.9 in × 7.8 in)Weight45 kg (99.2 lb)Far unitOperating voltage range85 V to 264 V AC, 47 Hz to 63 HzRated current85 V to 264 V AC, 47 Hz to 63 HzNoise emissionin typical lab environmentapprox. 77.5 dB(A)Environmental conditionsTemperature rangesMinimum operating temperature (ambient)ultra broadband load and fan unit+5 °CMaximum operating temperature (ambient)ultra broadband loadsee derating curve for average power versus ambient temperature on page 2Maximum operating temperature (air inlet)fan unit+45 °CMaximum operating temperature (air inlet)fan unit-40 °C to +80 °CStorage temperature rangeultra broadband load and fan unit-40 °C to +80 °CDemp heatultra broadband load95% noncondensingOperation above sea levelultra broadband load and fan unit2000 m | Cooling | | convection cooling, optional fan unit |
| Dimensions (W × H × D) including handles and feet (19.4 in × 18.9 in × 7.8 in) Weight 45 kg (99.2 lb) Far unit 50 co 264 V AC, 47 Hz to 63 Hz Operating voltage range 85 V to 264 V AC, 47 Hz to 63 Hz Rated current 85 V to 264 V AC, 47 Hz to 63 Hz Noise emission in typical lab environment approx. 77.5 dB(A) Environmental conditions approx. 77.5 dB(A) Environmental conditions see derating curve for average power versus ambient temperature (ambient) Minimum operating temperature (ambient) ultra broadband load see derating curve for average power versus ambient temperature on page 2 Maximum operating temperature (air inlet) fan unit +45°C Maximum operating temperature (air inlet) fan unit -40°C to +80°C Storage temperature range ultra broadband load -40°C to +80°C Damp heat ultra broadband load -40°C to +80°C Damp heat ultra broadband load -40°C to +80°C Operation above sea level ultra broadband load and fan unit -40°C to +80°C | General data | | |
| Fan unit So Y to 264 V AC, 47 Hz to 63 Hz Operating voltage range S5 V to 264 V AC, 47 Hz to 63 Hz Rated current \$ 0.9 A Noise emission in typical lab environment approx. 77.5 dB(A) Environmental conditions Temperature ranges So Y to 264 V AC, 47 Hz to 63 Hz Maxinum operating temperature (ambient) in typical lab environment approx. 77.5 dB(A) Maxinum operating temperature (ambient) ultra broadband load and fan unit +5°C Maxinum operating temperature (ambient) ultra broadband load see derating curve for average power versus ambient temperature on page 2 Maxinum operating temperature (air inlet) fan unit +45°C Maxinum operating temperature (air inlet) fan unit -40°C to +80°C Storage temperature range ultra broadband load and fan unit -40°C to +80°C Damp heat ultra broadband load s95% noncondensing Image temperature range ultra broadband load s90% noncondensing Image temperature range ultra broadband load and fan unit 2000 m | Dimensions (W \times H \times D) | including handles and feet | |
| Operating voltage range85 V to 264 V AC, 47 Hz to 63 HzRated current< 0.9 ANoise emissionin typical lab environmentapprox. 77.5 dB(A)Environmental conditionsTemperature rangesMinimum operating temperature (ambient)ultra broadband load and fan unit+5 °CMaximum operating temperature (ambient)ultra broadband loadsee derating curve for average power versus ambient temperature on page 2Maximum operating temperature (ambient)Ida unit+45 °CMaximum operating temperature (air inlet)fan unit-40 °C to +80 °CStorage temperature rangeultra broadband load< 95% noncondensingDamp heatultra broadband load and fan unit< 90% noncondensingOperation above sea levelultra broadband load and fan unit2000 m | Weight | | 45 kg (99.2 lb) |
| Rated current≤ 0.9 ANoise emissionin typical lab environmentapprox. 77.5 dB(A)Environmental conditionsEmperature rangesMinimum operating temperature (ambient)ultra broadband load and fan unit+5°CMaximum operating temperature (ambient)ultra broadband loadsee derating curve for average power versus ambient temperature on page 2Maximum operating temperature (air inlet)fan unit+45°CMaximum operating temperature (air inlet)fan unit+60°CStorage temperature rangeultra broadband load-40°C to +80°CDamp heatultra broadband loads95% noncondensingGperation above sea levelultra broadband load and fan unit2000 m | Fan unit | | |
| Noise emissionin typical lab environmentapprox. 77.5 dB(A)Environmental conditionsTemperature rangesMinimum operating temperature (ambient)ultra broadband load and fan unit+5°CMaximum operating temperature (ambient)ultra broadband loadsee derating curve for average power versus ambient temperature on page 2Maximum operating temperature (ambient)fan unit+45°CMaximum operating temperature (air inlet)fan unit+60°CStorage temperature rangeultra broadband load and fan unit-40°C to +80°CDamp heatultra broadband load≤ 95% noncondensingImage temperature rangeultra broadband load≤ 90% noncondensingOperation above sea levelultra broadband load and fan unit2000 m | Operating voltage range | | 85 V to 264 V AC, 47 Hz to 63 Hz |
| Environmental conditions Temperature ranges Minimum operating temperature (ambient) ultra broadband load and fan unit +5 °C Maximum operating temperature (ambient) ultra broadband load see derating curve for average power versus ambient temperature on page 2 Maximum operating temperature (ambient) ultra broadband load +45 °C Maximum operating temperature (air inlet) fan unit +45 °C Maximum operating temperature (air inlet) fan unit -40 °C to +80 °C Storage temperature range ultra broadband load -40 °C to +80 °C Damp heat ultra broadband load ≤ 95 % noncondensing fan unit se optiming ≤ 90 % noncondensing for unit ultra broadband load and fan unit 2000 m | Rated current | | ≤ 0.9 A |
| Temperature ranges Minimum operating temperature (ambient) ultra broadband load and fan unit +5°C Maximum operating temperature (ambient) ultra broadband load see derating curve for average power versus ambient temperature on page 2 Maximum operating temperature (ambient) fan unit +45°C Maximum operating temperature (air inlet) fan unit +60°C Storage temperature range ultra broadband load and fan unit -40°C to +80°C Damp heat ultra broadband load seg 5% noncondensing fan unit seg 0% noncondensing seg 0% noncondensing Operation above sea level ultra broadband load and fan unit 2000 m | Noise emission | in typical lab environment | approx. 77.5 dB(A) |
| Minimum operating temperature (ambient)ultra broadband load and fan unit+5°CMaximum operating temperature (ambient)ultra broadband loadsee derating curve for average power versus ambient temperature on page 2fan unitfan unit+45°CMaximum operating temperature (air inlet)fan unit+60°CStorage temperature rangeultra broadband load and fan unit-40°C to +80°CDamp heatultra broadband load≤ 95% noncondensingfan unitse derating curve for average power versus ambient temperature on page 2Operation above sea levelultra broadband load and fan unit | Environmental conditions | | |
| Maximum operating temperature (ambient) ultra broadband load see derating curve for average power versus ambient temperature on page 2 fan unit +45 °C Maximum operating temperature (air inlet) fan unit +60 °C Storage temperature range ultra broadband load and fan unit -40 °C to +80 °C Damp heat ultra broadband load ≤ 95% noncondensing fan unit se derating curve for average power versus ambient temperature on page 2 for an unit -40 °C to +80 °C Damp heat ultra broadband load ≤ 95% noncondensing fan unit ≤ 90% noncondensing for unit abroadband load and fan unit 2000 m | Temperature ranges | | |
| Maximum operating temperature (ambient) ultra broadband load ambient temperature on page 2 fan unit +45 °C Maximum operating temperature (air inlet) fan unit +60 °C Storage temperature range ultra broadband load and fan unit -40 °C to +80 °C Damp heat ultra broadband load ≤ 95 % noncondensing fan unit ≤ 90 % noncondensing Operation above sea level ultra broadband load and fan unit 2000 m | Minimum operating temperature (ambient) | ultra broadband load and fan unit | +5°C |
| Maximum operating temperature (air inlet) fan unit +60°C Storage temperature range ultra broadband load and fan unit -40°C to +80°C Damp heat ultra broadband load ≤ 95% noncondensing fan unit ≤ 90% noncondensing Operation above sea level ultra broadband load and fan unit | Maximum operating temperature (ambient) | ultra broadband load | |
| Storage temperature range ultra broadband load and fan unit -40 °C to +80 °C Damp heat ultra broadband load ≤ 95% noncondensing fan unit ≤ 90% noncondensing Operation above sea level ultra broadband load and fan unit | | fan unit | +45°C |
| Damp heat ultra broadband load ≤ 95% noncondensing fan unit ≤ 90% noncondensing Operation above sea level ultra broadband load and fan unit 2000 m | Maximum operating temperature (air inlet) | fan unit | +60°C |
| fan unit < 90% noncondensing | Storage temperature range | ultra broadband load and fan unit | -40°C to +80°C |
| Operation above sea level ultra broadband load and fan unit 2000 m | Damp heat | ultra broadband load | ≤ 95% noncondensing |
| | | fan unit | ≤ 90% noncondensing |
| Transportation above sea level ultra broadband load and fan unit 4600 m | Operation above sea level | ultra broadband load and fan unit | 2000 m |
| | Transportation above sea level | ultra broadband load and fan unit | 4600 m |

¹⁾ Depends on input power and exposure time; +70°C surface temperature must not be exceeded.

| Ordering information R&S®UBL100 | | | | | | |
|-------------------------------------------------------|------------|--------------|--|--|--|--|
| Designation | Туре | Order No. | | | | |
| Ultra broadband load | R&S®UBL100 | 5355.6105.02 | | | | |
| Ultra broadband load, with fan unit, on caster wheels | R&S®UBL100 | 5355.6105.22 | | | | |
| Ultra broadband load, with fan unit | R&S®UBL100 | 5355.6105.32 | | | | |
| Ultra broadband load, on caster wheels | R&S°UBL100 | 5355.6105.42 | | | | |